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FEDERAL COMMUNICATIONS COMMISSION
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**Before The
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

In the Matter of:

Amendment of the Commission's
Rules to Establish Rules and
Policies Pertaining to a Mobile
Satellite Service in the
1610-1626.5/2483.5-2500 MHz
Frequency Bands

CC Docket No. 92-166

COMMENTS OF MOTOROLA SATELLITE COMMUNICATIONS, INC.

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Dated: May 5, 1994

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SUMMARY

Motorola Satellite Communications, Inc. ("Motorola") hereby submits its comments on the proposed policies and rules set forth in the Notice of Proposed Rulemaking ("NPRM") in the above-captioned proceeding. Motorola applauds the Commission's recognition of the benefits which flow from the provision of Mobile Satellite Service ("MSS") by Low-Earth-Orbit ("LEO") satellite systems. These benefits, as articulated by the Commission, have ample support in the record and demonstrate the strong public interest rationale for promoting a new generation of global portable satellite services. In addition, LEO MSS systems can play an important part in the Global Information Infrastructure, a linchpin of the U.S. government's telecommunications policy. Moreover, subject to certain recommended modifications, Motorola supports the financial and technical qualification requirements proposed by the Commission as necessary to secure and maximize the public benefits of LEO MSS and to realize the Commission's goals. The Commission has ample authority to prescribe such eligibility thresholds in furtherance of the public interest, and to reject without a hearing applications that, despite the opportunity for amendment, do not conform to those threshold requirements.

Also, subject to certain important understandings and modifications, Motorola generally supports the Commission's spectrum plan as an appropriate method for sharing of the 1610-1626.5/2483.5-2500 MHz frequency bands (the "LEO MSS Bands") by

all qualified LEO MSS applicants. In the interest of prompt licensing of the LEO MSS systems, Motorola is prepared to accept the Commission's proposed plan, but notes that it cannot accept any further reduction in spectrum assignments without irreparably damaging the integrity of its business plan and the financial viability of the IRIDIUM^{TM/SM} Communications System.

For the most part, the Commission's spectrum sharing plan correctly balances the requirements of the proposed LEO MSS systems. It is sufficiently flexible to accommodate changed circumstances, and avoids a finding of mutual exclusivity between the pending applicants. If adopted by the Commission, along with Motorola's requested changes, the plan would eliminate the need for any further consideration of spectrum auctions, comparative hearings or lotteries. Motorola further believes that the Commission should implement this band sharing plan immediately upon licensing without the need for any interim plan.

Motorola also makes certain discrete recommendations with respect to the Commission's proposed rules on intra- and inter-service sharing. In the area of intra-service sharing, the Commission must institute limits on out-of-band emissions from MSS terminals in order to avoid unacceptable levels of interference in the special situation arising in the LEO MSS Bands, i.e., where many carriers will be employing different bandwidths and modulations and operating in contiguous frequencies. In the area of sharing with other services, Motorola makes certain recommendations aimed at affording LEO MSS systems additional flexibility and ensuring that the limitations

enunciated in the Commission's rules apply only where necessary to protect another service from harmful interference. With respect to sharing between LEO MSS feeder links and systems in the Fixed Satellite Service ("FSS"), Motorola points out that the geographic exclusion zones suggested by the MSS Above 1 GHz Negotiated Rulemaking Committee ("NRC") are not adequate in light of the types of FSS systems proposed subsequent to the negotiated rulemaking, and the Commission's rules should reflect these changed circumstances.

With respect to the regulatory status of LEO MSS providers, Motorola urges the Commission to determine that the provision of space segment capacity by Big LEO MSS licensees to providers of commercial mobile radio services is not common carriage. Such a determination is within the discretion expressly bestowed on the Commission by Congress in the 1993 Omnibus Budget Reconciliation Act. Application of the NARUC I test to the record compiled in this proceeding amply demonstrates that provision of space segment capacity to MSS service providers is not common carriage.

Motorola also suggests two reinforcements of the proposed milestones, recommends the elimination of certain cumbersome reporting requirements that are inapposite for Big LEO MSS systems, and also requests the substitution of the term "substantially equivalent" for the unduly narrow term "technically identical" to define the scope of blanket licenses. Motorola also makes certain other suggestions with respect to the Commission's proposed licensing rules.

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I. INTRODUCTION

Motorola Satellite Communications, Inc. ("Motorola") hereby submits its comments on the proposed policies and rules set forth in the Notice of Proposed Rulemaking ("NPRM") in the above-captioned proceeding. Subject to the modifications and clarifications requested herein, Motorola supports the Commission's proposed rules. As modified and clarified, these rules would firmly secure for the public the vast benefits that will flow from the provision of Mobile Satellite Service ("MSS") by Low-Earth-Orbit ("LEO") satellite systems.

Throughout these comments, Motorola recommends specific revisions and additions to the phrasing of the rules proposed by

the Commission and provides the reasoning for these changes.^{1/} For ease of reference, the text of the proposed rules is also attached as Appendix 2, with Motorola's recommended modifications to the Commission's proposals set out in "blackline" format. Again, Motorola emphasizes that many of its recommendations are in the way of fine-tuning or clarifying the Commission's proposals and commends the Commission for the difficult achievement of preparing a well-balanced and reasoned licensing framework that will allow this important new service to go forward rapidly.

II. THE SUBSTANTIAL BENEFITS OF BIG LEO MSS SYSTEMS

The benefits that the Commission expects to flow to the U.S. and global economies from the provision of MSS by Big LEO systems are amply supported by the record compiled in this and related proceedings, and constitute an accurate articulation of the public interest. Moreover, Motorola believes that, subject to certain minor adjustments, the Commission's proposed qualifications, licensing and sharing rules are essential to securing those benefits and to realizing the substantial benefits of the Big LEO MSS systems.

^{1/} Because of their technical nature, many of Motorola's recommendations with respect to intra- and inter-service sharing are noted only briefly in the body of these comments. They are more fully developed and explained in a Technical Appendix attached hereto as Appendix 1.

A. The Public Interest Benefits of Big LEO MSS Systems

Big LEO MSS systems will introduce ubiquitous, affordable, high-quality, digital mobile telecommunications services to the general population, to and from any point in the world, by means of portable handheld terminals similar in size to those used in the cellular telephony. These terminals will be carried by MSS users wherever they are or go, and will enable them to reach or be reached by any other terminal connected to the public switched network (including fixed line telephones, cellular or PCS terminals as well as other MSS terminals). Gaining access to anyone else will become a function of the user's choice without being hampered by location constraints or technological limitations, making international accessibility a key feature of LEO MSS systems. This vision for the telecommunications future offered by Big LEO MSS systems is not attainable by any other technology in use today, including terrestrial and geostationary satellite systems.

Furthermore, even setting aside the capability of global service to handheld terminals that Big LEO MSS systems alone possess, the cost of achieving global service by such systems will be only a small percentage of the cost that would be required to wire all households in the world currently lacking telecommunications service. Big LEO MSS systems will thus constitute an important step towards realizing the Administration's vision of a global information infrastructure.

In addition, Big LEO MSS systems will provide a significant boost to global and U.S. economic growth, both

directly and indirectly. Many of the economic benefits that will flow from Big LEO MSS systems are documented, and some of them quantified, in a report prepared by Nathan Associates, Inc. and attached hereto as Appendix 3.^{2/}

B. Benefits to U.S. Users from Big LEO MSS Systems

Provision of MSS by Big LEO systems will make near-toll quality voice and data services available to rural communities that are currently not interconnected with the switched wireline network. Motorola has estimated that over 7 million Americans live in such remote locations (including off-shore points and Alaska), where landline and/or mobile radio services currently are minimal or non-existent.^{3/}

Even in areas that are currently linked to the public switched network or have access to cellular service, LEO MSS systems will potentially offer a valuable service option to the American public, and will thus enhance the competitive environment for mobile communications. While Motorola's IRIDIUM^{TM/SM} Communications System is primarily intended to complement, rather than compete with, currently established terrestrial cellular systems, the addition of Big LEO MSS systems to the range of

^{2/} Nathan Associates, Inc., "The Economic Impacts of Low Earth Orbit Satellite Systems" (May 4, 1994) ("Nathan Report").

^{3/} Application of Motorola Satellite Communications, Inc. for Authority to Construct, Launch and Operate a Low Earth Orbit Satellite System in the 1610-1626.5 MHz Band, File Nos. 9-DSS-P-21(87), CSS-91-010, at 11 (filed Dec. 3, 1990) (the "IRIDIUM Application").

mobile service options is bound to inure to the benefit of consumers.

Big LEO MSS systems also enjoy decisive advantages over terrestrial technologies, as they will not face the limited range and similar inhibitions of cellular and other similar mobile services. Those advantages will become especially important in times of crisis and emergency when terrestrial based systems may be impaired or overloaded. Unlike terrestrial systems, LEO MSS systems, like the IRIDIUM system, will not be significantly affected by natural disasters such as earthquakes, fires, floods or hurricanes. The inherent portability of Big LEO MSS terminals makes such systems ideal for emergency, rescue, medical and other such crisis teams.

In addition, Big LEO MSS systems will enable seamless roaming across the country, filling large gaps in mobile service availability and eliminating the potential problems associated with incompatible terrestrial digital standards. Motorola's IRIDIUM system will offer users dual-mode (cellular-satellite) terminals to enhance their service options and provide ubiquitous coverage of all fifty states as well as all U.S. territories and possessions.^{4/}

The services to be provided by the IRIDIUM system include voice, facsimile, data and a wide variety of messaging and paging services. See IRIDIUM Application at 36-37. All of

^{4/} LEO MSS systems allow users to make outgoing and receive incoming calls at any time, from any location. Wireless terrestrial systems have limited capability to forward incoming calls to mobile terminals outside of their local area network, and outbound calls generally are limited to areas where roaming agreements have been reached.

these services will be available from handheld wireless terminals, giving users the freedom to transmit and receive messages from any location in the world at any time. Such feature-rich data and voice services, coupled with the unique capabilities of Big LEO MSS systems in providing universal access to such services, will greatly complement the National Information Infrastructure.^{5/}

Big LEO MSS systems will further the public interest in efficient utilization of the scarce spectrum resource. Motorola's IRIDIUM system, for example, will attain unique efficiencies in the use of spectrum by using the same frequencies for its uplinks and downlinks, and by substantially reusing its bandwidth by means of satellite spot beams generated by the latest phased array antenna technologies. See IRIDIUM Application at 12-13.

The introduction of Big LEO MSS systems will also enhance competition for MSS services. Thus, Big LEO MSS systems will promote the Commission's longstanding policies favoring competition and multiple entry in the provision of space-based communications services, and will further the public interest. See, e.g., Establishment of Domestic Communications-Satellite Facilities by Non-Governmental Entities, Second Report and Order, 35 F.C.C.2d 844, 847 (1972) ("The presence of competitive sources of supply of specialized services, both among satellite system

^{5/} See, e.g., Information Infrastructure Task Force, The National Information Infrastructure: Agenda for Action 10 (released Sept. 15, 1993), recognizing that "[m]any of the dramatic changes expected from the development of the information infrastructure will grow out of advances in wireless technologies."

licensees and between satellite and terrestrial systems, should encourage service and technical innovation and provide an impetus for efforts to minimize costs and charges to the public").

C. Benefits to U.S. Users and the International Public from Provision of Global MSS By Big LEO Systems

The benefits that flow from the provision of mobile service by LEO MSS systems are substantial, owing to their ability to provide global dialtone. Many of these benefits cannot be provided by other technologies due to their reliance on wireline facilities or limited geographic coverage.

Unlike geostationary systems, which concentrate coverage on their target markets within a limited footprint, LEO MSS systems will offer the same capacity and quality of service to developing countries as to the industrial world, including the people living in the rain forest, the vast deserts and steppes, and in the polar regions.

1. The Vision of Global MSS Communications

LEO MSS systems will make voice and data services available to a vast number of users located in or roaming through areas that currently lack access to the public switched telephone network.^{6/} As Chairman Hundt pointed out in his recent address to the first World Telecommunication Development Conference held

^{6/} Many of these areas will likely not be connected to the switched telephone network for at least the foreseeable future. As stated, instead of optimizing coverage to certain markets, as geostationary systems do, LEO MSS systems will provide truly global coverage to urban and rural, developed and developing populations alike, by putting a dial tone within reach of everyone on the planet.

in Buenos Aires, less than a third of the people on our planet have ready access to telephones.^{7/} The telephone density (lines per 100 people) outside the United States generally is much lower than in the United States. Indeed, in its report, Nathan Associates observes that the telephone density in nine countries accounting for one half of the world's population is one line per 100 people or less, compared to 51 lines per 100 people in the U.S. See Nathan Report at 2.

Big LEO MSS systems will become an important part of the Global Information Infrastructure ("GII") whose construction and operation has become a linchpin of the U.S. government's international telecommunications policy. In his speech opening the World Telecommunication Development Conference held in Buenos Aires in March 1994, Vice President Gore articulated a vision of such a global infrastructure that would "bring all the communities of the world together" through "a planetary information network that transmits messages and images . . . from the largest city to the smallest village on the continent."^{8/} In contributing to the GII, Big LEO MSS systems will help reduce the isolation of people in the developing countries that the U.S.

^{7/} See Address of Chairman Reed E. Hundt to the World Telecommunication Development Conference (Mar. 22, 1994) ("Hundt March 22, 1994 Address") (attached hereto as Appendix 4). See also IRIDIUM Application at 32 (estimates of people with no access to telephone service range from one to two billion).

^{8/} See Address of Vice President Al Gore to the World Telecommunication Development Conference (Mar. 21, 1994), reprinted in 54 Daily Gov't Rep. (BNA), M-1 (Mar. 22, 1994) (attached hereto as Appendix 5).

international telecommunications policies are aimed at bringing to an end.^{9/}

The policy pronouncements of Vice President Gore and Chairman Hundt further demonstrate an awareness that satellite services will be an important vehicle for realizing this vision. As Chairman Hundt emphasized in Buenos Aires, "[s]atellite technology offers opportunities to build a global seamless connection among all networks," Hundt March 22, 1994 Address at 3, and all administrations should support the satellite providers' efforts to serve the globe. See id.

The vision of a GII articulated by Vice President Gore and Chairman Hundt is consistent with many of the long-standing goals of the international telecommunications policies of the United States, including:

- The promotion of the free flow of information throughout the world;
- The promotion of the development of efficient, innovative, and cost-efficient international communications services responsive to the needs of users and supportive of the expanding requirements of commerce and trade; and
- The promotion of continuing evolution of an international configuration of communications services that can meet the needs of all nations,

^{9/} See Hundt March 22, 1994 Address.

with attention toward providing such services to developing nations.^{10/}

2. Cost-Effectiveness of Big LEO MSS Systems

The marginal cost of providing MSS by Big LEO systems to areas lacking access to the telecommunications infrastructure is minimal compared to the cost of building out wireline terrestrial networks to reach those areas. For purposes of illustration, Nathan Associates has determined that if the IRIDIUM system were used solely to provide telephone service in nine countries with a telephone density of one line per 100 inhabitants or less it would cost \$5.11 per additional line, a fraction of the cost of providing wireline access throughout those countries. See Nathan Report at 2-3 n.3.

Of course, Nathan Associates' estimate substantially overstates the IRIDIUM system's per capita cost, as it conservatively assumes that the entire constellation will be dedicated to serving unserved areas in these nine countries. In reality, the costs of the satellite constellation will be spread among users throughout the entire world, and the cost of reaching every unserved area in the developing world will be truly marginal.

An integral part of Motorola's business plan for the IRIDIUM system is the provision of public telephones to areas lacking access to the public switched telephone network. See IRIDIUM Application at 32. Isolated villages or communities would gain ready access to a sophisticated global infrastructure

^{10/} See Establishment of Satellite Systems Providing Int'l Communications, 101 F.C.C.2d 1046, 1064-65 (1985).

by means of a single IRIDIUM system public telephone instead of the multi-million dollar investment required to establish wireline links to that village or community.

Accordingly, Big LEO MSS systems will provide a particularly efficient and low-cost way of ending the isolation of less-developed countries throughout the world, and attaining one of the major objectives of the Global Information Infrastructure.

3. Economic Growth Prospects

Virtually ubiquitous global mobile telephone service will give a significant boost to the growth of the economies in the United States and abroad. The construction of even one or two Big LEO MSS systems, in conjunction with the development of associated subscriber equipment and sale of the MSS services, will substantially increase earnings and employment in the United States. Nathan Associates estimates that, by 2002, construction of the IRIDIUM system and sales of user equipment alone will increase U.S. household earnings and infuse at least \$6.7 billion into the U.S. economy. This program will also create a significant number of high paid, high technology, long term jobs (241,000 U.S. job-years by 2002). See Nathan Report at 5, 8. These estimates do not include the earnings generated by the actual sale of MSS services both on the wholesale level (provision of space segment capacity to gateway providers) and on the retail level.

The lack of a telecommunications infrastructure is one of the most important disincentives to U.S. companies from

investing in developing countries.^{11/} By making communications facilities available within arm's reach virtually everywhere in the world, Big LEO MSS systems can reduce this concern and change the cost-benefit tradeoffs in the calculus of U.S. corporations considering international expansion.^{12/} The expansion of

^{11/} See, e.g., Minoli de Soysa, Foreign Investment Up in Sri Lanka Despite Fears, Reuters (Money Report), Oct. 20, 1993 (investment in telecommunications infrastructure in Sri Lanka vital for ensuring the infrastructure is available for large-scale investment); Stefan Wagstyl, Survey of IMF World Economy and Finance, Financial Times, Sept. 24, 1993 (private companies held back from India because of the inefficiency of public sector services, including telecommunications); Indochina to get help from Asian Development Bank, Reuters (Money Report, Bonds Capital Market), Oct. 23, 1992 (Asian Development Bank ("ADB") officials reported as stating that "the lack of power, transportation and telecommunications facilities are among the biggest investment blocks in peninsular Southeast Asia"); The future of mass retailing is global, Discount Store News, Oct. 5, 1992 ("Some of the early pioneers in exporting retailing services [from the U.S. abroad] have found investment barriers from closed distribution channels and discriminatory store licensing requirements, to the lack of infrastructure in critical associated industries such as banking, telecommunications or transportation"); Ilir Ikonimi, Albania Woos Foreign Investors to Rescue Economy, Reuters Library Report, Aug. 21, 1992 (Albanian Economy and Finance Minister reported as saying that "[t]he country is ready to receive foreign investment but the lack of an adequate infrastructure is a big problem."); Rahita Elias, Sea-Land Zeroes in on S-E Asia, Business Times, July 8, 1992, at 2 (Shipping) (officer of major U.S. shipping company reported as saying that "the quality of infrastructure available would determine which countr[ies] in the region emerge as 'winners' in the current decade since poor infrastructure will act as a 'significant deterrent' to foreign investment and export cost competitiveness"); Privatization in Poland being held up by slack investor interest, official says, BNA International Trade Daily, May 7, 1992 (undersecretary of state in Poland's Central Planning Office reported as attributing the "'slow pace' of foreign investment to . . . poor infrastructure, particularly telecommunications facilities. . . ."); U.S. Department of Commerce, The international economic outlook in 1992, U.S. Industrial Outlook, Jan. 1992 (infrastructure deficiencies in certain Asian countries may divert some foreign manufacturing investment to other countries in the region).

^{12/} In developing countries, LEO MSS systems can serve an additional function by acting as a backup to the PSTN in the event of failure. This can be of great value to banking and
(continued...)

investment opportunities on a global scale will increase revenue streams and improve the profitability for U.S. companies. Increased production also can enhance economies of scale, resulting in lower costs to the benefit of U.S. consumers.

Big LEO MSS systems will assist in the development of international markets for U.S. goods and services, making previously unreachable prospective consumers accessible to information about the offerings of U.S. companies. The availability of Big LEO MSS services can improve productivity, and lower the cost of doing business throughout the world. Big LEO systems specifically will make possible the expeditious transmission of information and the constant and instant accessibility of personnel. Travelers will be able to contact their home office at a moment's notice to place orders, check inventory, and negotiate contracts. LEO MSS systems will thus dramatically accelerate corporate decisionmaking and the conduct of business in general.^{13/}

^{12/} (...continued)
financial institutions, government agencies and other vital facilities. Also, LEO MSS systems can alleviate congestion on the PSTN caused by a limited telecommunications infrastructure.

^{13/} Finally, by offering the same coverage to communities in rural areas as they will to urban markets, LEO MSS systems could have a profound effect on rural economies. Improved telecommunications provided by LEO MSS systems could encourage larger businesses to expand beyond urban areas, and help village-level entrepreneurs and small businesses gain access to new markets. Local economies will be stimulated, creating employment, revenues, and perhaps even helping to stem rural-to-urban migration.

4. U.S. Leadership in Satellite Communications

The implementation of Big LEO MSS systems will improve and enhance the U.S. competitiveness and leadership in such critical areas as mobile, personal and satellite communications, as well as space related technologies. U.S. leadership in these areas is especially important in light of the inherently global nature of the services to be offered over the Big LEO MSS systems. In view of the tremendous capabilities and potential of some of the proposed new MSS systems, the Commission should help the U.S. industry seize the initiative by expeditiously licensing U.S. systems.

5. Substantial Social Benefits

By providing virtually ubiquitous voice and data services to and from handheld terminals, Big LEO MSS systems will be instrumental in enhancing the mobility and decentralization, not only of international business and finance, but also of people. These global systems will become an indispensable consumer product for the tens of millions of international travelers desiring to maintain a communication link to the rest of the world. In addition, the new MSS service offerings will alleviate some of the congestion of business and finance centers caused by the need for access to fixed facilities, reduce the dependence of the working population on fixed plant and facilities, and assist in urban planning.

Big LEO MSS systems will result in more reliable safety, distress, medical and other emergency voice and

communication services because they are unaffected by terrestrial disasters. They will give individuals who are caught in disasters or accidents instant communication with the outside world. They will enable rescue groups to identify the positions of callers. The attached April 21, 1994 letter from Jose A. Aponte of the American Red Cross to Ms. Judith D. Corse of Iridium, Inc. (Appendix 6) articulates the strong support of the American Red Cross for the LEO MSS technology, in view of the unique advantages of this technology for services associated with emergency medical and other humanitarian relief.

Big LEO MSS systems will help make the participatory democracy envisaged by Chairman Hundt a reality by endowing individuals with the capability of a more direct say in domestic and international political fora than ever before. See Hundt March 22, 1994 Address. Moreover, Big LEO MSS systems will allow for the sharing of knowledge and will further research, by assisting in the worldwide data network linking schools and other educational, academic and research institutions. Big LEO MSS systems will allow global environmental monitoring, tracking nascent areas of environmental concern in whatever far-flung place they may appear. For example, these systems will make possible the simultaneous collection and comparison of environmental data on a worldwide basis, an initiative repeatedly mentioned by the Vice President in his speeches on the GII.

Many of these very substantial benefits are difficult to quantify. Because infrastructure projects are typically evaluated within the constraints of national boundaries, the multipliers used by infrastructure models to calculate the spill-

over effect of a project on the economy are insufficient to capture the effect of the ready-made worldwide information infrastructure to be supplied by Big LEO MSS systems. This infrastructure will dramatically enhance the productivity and ability to do business, reduce costs, open up investment opportunities and new markets, create new possibilities in the areas of rescue operations, education, and environmental monitoring.^{14/}

III. STRINGENT QUALIFICATION STANDARDS ARE ESSENTIAL TO SECURING AND MAXIMIZING THE BENEFITS FROM BIG LEO MSS SYSTEMS

Subject to the minor modifications recommended herein, the technical and financial qualification standards proposed by the Commission are essential to securing the benefits identified

^{14/} The record accumulated in this and related proceedings amply documents the unique capability of Big LEO MSS systems to provide global services, their advantages over alternative technologies, and the vast public benefits flowing from those advantages. Specifically, the Commission's conclusions are supported by the record in this proceeding, including the comments being filed in response to the NPRM; the Report of the MSS Above 1 GHz Negotiated Rulemaking Committee, dated Apr. 6, 1993, together with Appendices, Annexes and Addenda thereto, and the voluminous record of the NRC; the record in the spectrum allocation proceedings, which resulted in the allocation of the LEO MSS Bands, see Amendment of Section 2.106 of the Commission's Rules to Allocate the 1610-1626.5 MHz and the 2483.5-2500 MHz Bands for Use by the Mobile-Satellite Service, Including Non-geostationary Satellites, Report & Order, ET Docket No. 92-28, RM-7771, RM-7773, RM-7805, RM-7806, RM-7927, 9 FCC Rcd. 536 (1994); and the related application proceedings, see Motorola's IRIDIUM Application, Supplemental Information (filed Feb. 22, 1991) and Minor Amendment, File Nos. 9-DSS-P-91(87); CSS-91-010; the Applications of Constellation Communications, Inc., File Nos. 17-DSS-P-91(48), CSS-91-013, Ellipsat Corporation, File Nos. 18-DSS-P-91(18), Loral Qualcomm Satellite Services, Inc., File Nos. 19-DSS-P-91(48), CSS-91-014, TRW, Inc., File Nos. 20-DSS-P-91(12), CSS-91-015 (filed Aug. 10, 1992), AMSC Subsidiary Corp., File Nos. 15-DSS-MP-91, 16-DSS-MP-91.

above and maximizing the public interest in connection with the provision of MSS by Big LEO systems.

A. Technical Qualifications

1. Global Service Requirement

Motorola fully supports the Commission's global service requirement. As demonstrated above, the Commission should reach the reasoned conclusion that the benefits flowing from worldwide provision of MSS by Big LEO systems would be substantially greater than those associated with a U.S.-only MSS system. See pages 2-16 supra. For example, Nathan Associates' estimates of increased jobs and earnings from the construction of the IRIDIUM system are predicated on a global system and would be substantially lower if only geographically limited systems were approved.^{15/} Global systems give rise to substantial economies of scale, which sharply reduce the average cost per subscriber and thereby result in lower rates for end users in the U.S. and elsewhere. Indeed, in light of the substantial costs required to construct and operate LEO MSS systems, U.S.-only LEO MSS systems could not be economically viable.

A U.S.-only MSS system would be less attractive to international users and would suffer an inherent competitive disadvantage in relation to proposed foreign LEO MSS systems. As the Commission is aware, several other countries have advance-published with the ITU their plans for LEO or geostationary

^{15/} See Nathan Report at 7. With respect to user terminals, Nathan Associates has conservatively included in its calculations only estimated purchases by U.S. subscribers.